

# HiPerFET™ Power MOSFETs

N-Channel Enhancement Mode  
High dv/dt, Low  $t_{rr}$ , HDMOS™ Family

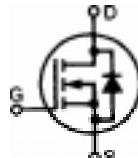
Preliminary data

Symbol	Test Conditions	Maximum Ratings		
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	900		V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$	900		V
$V_{GS}$	Continuous	$\pm 20$		V
$V_{GSM}$	Transient	$\pm 30$		V
$I_{D25}$	$T_c = 25^\circ\text{C}$	16		A
$I_{DM}$	$T_c = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	64		A
$I_{AR}$	$T_c = 25^\circ\text{C}$	16		A
$E_{AR}$	$T_c = 25^\circ\text{C}$	45		mJ
$dv/dt$	$I_s \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ , $R_G = 2 \Omega$	5		V/ns
$P_D$	$T_c = 25^\circ\text{C}$	360		W
$T_J$		-55 ... +150		$^\circ\text{C}$
$T_{JM}$		150		$^\circ\text{C}$
$T_{stg}$		-55 ... +150		$^\circ\text{C}$
$T_L$	1.6 mm (0.062 in.) from case for 10 s	300		$^\circ\text{C}$
$M_d$	Mounting torque	1.13/10		Nm/lb.in.
Weight		6		g

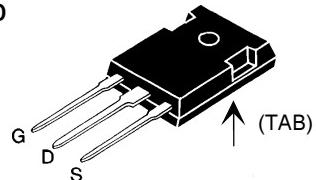
## IXFH16N90 IXFX16N90

$V_{DSS} = 900 \text{ V}$   
 $I_{D25} = 16 \text{ A}$   
 $R_{DS(on)} = 0.65 \Omega$

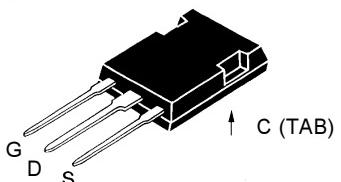
$t_{rr} \leq 200 \text{ ns}$



TO-247 AD  
(IXFH)



PLUS 247™  
(IXFX)



### Features

- International standard packages
- Low  $R_{DS(on)}$  HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
  - easy to drive and to protect
- Fast intrinsic Rectifier

### Applications

- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- AC motor control
- Temperature and lighting controls

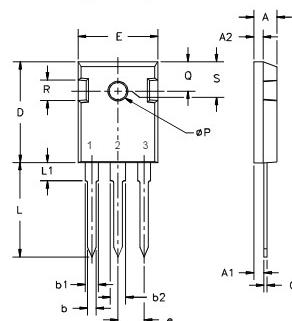
### Advantages

- Easy to mount with 1 screw (TO-247) (isolated mounting screw hole) or mounting clip or spring (PLUS 247™)
- Space savings
- High power density

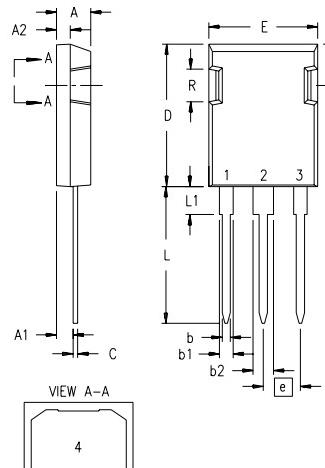
Symbol	Test Conditions	Characteristic Values		
		( $T_J = 25^\circ\text{C}$ , unless otherwise specified)	min.	typ.
$V_{DSS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$	900		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 5 \text{ mA}$	2.0	4.5	V
$I_{GSS}$	$V_{GS} = \pm 20 \text{ V}_{DC}$ , $V_{DS} = 0$		$\pm 100$	nA
$I_{DSS}$	$V_{DS} = 0.8 \cdot V_{DSS}$ $V_{GS} = 0 \text{ V}$	$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	25 250	$\mu\text{A}$
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$ , $I_D = 0.5 \cdot I_{D25}$ Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2 \%$		0.65	$\Omega$

Symbol	Test Conditions	Characteristic Values			
		( $T_J = 25^\circ\text{C}$ , unless otherwise specified)	min.	typ.	max.
$g_{fs}$	$V_{DS} = 10 \text{ V}; I_D = 0.5 \cdot I_{D25}$ , pulse test	6	10	S	
$C_{iss}$ $C_{oss}$ $C_{rss}$	$V_{GS} = 0 \text{ V}, V_{DS} = 25 \text{ V}, f = 1 \text{ MHz}$	4500		pF	
		430		pF	
		150		pF	
$t_{d(on)}$ $t_r$ $t_{d(off)}$ $t_t$	$V_{GS} = 10 \text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 2 \Omega$ (External),	27		ns	
		30		ns	
		120		ns	
		30		ns	
$Q_{g(on)}$ $Q_{gs}$ $Q_{gd}$	$V_{GS} = 10 \text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$	220		nC	
		30		nC	
		85		nC	
$R_{thJC}$ $R_{thCK}$			0.35	KW	
			0.25	KW	

Symbol	Test Conditions	Characteristic Values			
		( $T_J = 25^\circ\text{C}$ , unless otherwise specified)	min.	typ.	max.
$I_s$	$V_{GS} = 0 \text{ V}$		16	A	
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$		64	A	
$V_{SD}$	$I_F = I_S, V_{GS} = 0 \text{ V},$ Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2 \%$		1.5	V	
$t_{rr}$  $Q_{RM}$  $I_{RM}$	$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$  $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$  $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	200	ns		
		350	ns		
		1		$\mu\text{C}$	
	$I_F = I_S$ $-di/dt = 100 \text{ A}/\mu\text{s}$ , $V_R = 100 \text{ V}$	2		$\mu\text{C}$	
		10		A	
		15		A	

**TO-247 AD (IXFH) Outline**

Terminals: 1 - Gate  
2 - Drain  
3 - Source  
Tab - Drain

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A <sub>1</sub>	2.2	2.54	.087	.102
A <sub>2</sub>	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b <sub>1</sub>	1.65	2.13	.065	.084
b <sub>2</sub>	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	.205	.225
L	19.81	20.32	.780	.800
L <sub>1</sub>		4.50		.177
$\emptyset P$	3.55	3.65	.140	.144
Q	5.89	6.40	.232	.252
R	4.32	5.49	.170	.216
S	6.15	BSC	242	BSC

**PLUS 247™ Outline**


SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.193	.205	4.83	5.21
A <sub>1</sub>	.090	.100	2.29	2.54
A <sub>2</sub>	.075	.095	1.91	2.16
b	.045	.055	1.14	1.40
b <sub>1</sub>	.075	.084	1.91	2.13
b <sub>2</sub>	.115	.123	2.92	3.12
C	.024	.031	.061	.080
D	.819	.840	20.80	21.34
E	.620	.635	15.75	16.13
e	.215	BSC	5.45	BSC
L	.780	.800	19.81	20.32
L <sub>1</sub>	.150	.170	3.81	4.32
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83

1 - GATE  
2 - DRAIN (COLLECTOR)  
3 - SOURCE (EMITTER)  
4 - DRAIN (COLLECTOR)

IXYS reserves the right to change limits, test conditions, and dimensions.

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,881,106 5,017,508 5,049,961 5,187,117 5,486,715  
4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025